

The latter formulation may be viewed as constituting preferred ranges of ingredients, however, it is to be understood that the broader proportions given in the former formulation are also quite suitable and effective in providing water-resistant plaster compositions.

The invention is applicable to calcium sulfate plaster compositions or plaster and cement mixtures. While Portland cement does not deteriorate under conditions of moisture, such mixes tend to shrink upon final drying. Therefore, they do not lend themselves to perfect shapes when used in molds. Plasters, on the other hand, expand slightly on drying out and remain in this state, thereby reproducing perfect shapes when molded. Moreover, the rapid-setting properties of plaster compositions enable casting molds to be re-used at very much shorter time intervals than with cement compositions, that is to say, in the case of gypsum plasters in about half an hour as opposed to three days or more for cement, resulting in considerable economies in space and capital outlay on molds. A suitable mixture of cement and plaster can be used to produce the required expansion or contraction properties, but any composition containing plaster has heretofore had the disadvantage of lack of resistance to water. The invention is intended primarily to produce casting compositions, but trowelling compositions and the like can also be provided.

It has been observed that the presence of the volatile solvent produces cells in the set product and, thus, a reduction in its density. Such density reductions are particularly useful when they are at least 20% and this corresponds to a solvent percentage of about 5%. If no water-resistant properties are required, a cellular product can be obtained with the resin omitted.

It is envisaged that the composition may be sold in multipart packs and that the components thereof may be sold separately.

Hence, according to one aspect of the invention, there is provided an aqueous calcium sulfate plaster composition having incorporated therein a solid, low molecular weight waterproofing resin selected from the group consisting of vinyl toluene-butadiene copolymers, polyvinyl chloride, polyvinyl acetate, petroleum and coal tar hydrocarbon polymer resins and styrene and acrylic copolymers, the resin being dissolved in a substantially water-immiscible organic solvent which is dispersed in the aqueous phase and which evaporates from the composition at a rate similar to the evaporation rate of water from the composition, the properties of the essential ingredients (disregarding any fillers present) being:

	Percent by weight
Plaster solids plus cement (the latter if present)	30 - 60
Resin	0.25 - 15
Organic solvent	4 - 48
Water	20 - 50

the ratio by weight of cement to plaster solids being not greater than 1:1 (i.e., not greater than 50% by weight with respect thereto). The plaster solids may comprise various forms of calcium sulfate, for example, anhydrous calcium sulfate and/or calcium sulfate hemihydrate.

According to another aspect of the invention, a multi-pack composition is provided in which one of the packs comprises the solid ingredients and another, the

water, the organic solvent, the resin and a suspending agent. In a modification of this arrangement, the water is omitted from the second pack.

The invention further provides a liquid component for the composition comprising the water with the solution of the resin in the organic solvent dispersed therein, the weight of the organic solvent being more than a fifth of the weight of the water, and the weight of the resin being more than a tenth of the weight of the water. Alternatively all of the specified ingredients except for the water may be contained in one component of the composition, and the water is then added thereto.

Coumarone-indene resins, one of the preferred resin additives in the present invention, are well known in the art. In this regard reference is hereby made to Chapter 13 of the book "The Chemistry of Commercial Plastics" by Reginald L. Wakeman, particularly pages 286-292 (Reinhold Publishing Corp., New York, 1947). These resins are also disclosed and discussed at pages 176 and 729-732 of the "Handbook of Plastics" by Simonds and Ellis (D. Van Nostrand Co., Inc., New York, 1943). Such resins are derived from coal tar distillates (see H. H. Lowry, "Chemistry of Coal Utilization", Supplemental Volume, John Wiley & Sons, Inc., New York, 1963). Coal tar distillates are a fruitful source of cyclic unsaturates containing the double bond in non-benzenoid rings. Two of these coal tar compounds, coumarone and indene, can be converted to useful resins by reaction with, for example, sulfuric acid. Coumarone and indene both occur in the solvent naphtha cuts of coal tar distillates and have boiling points of 172° and 182°C., respectively. Since they are rather difficult to separate from each other, polymerization of the mixture can be effected to give coumarone-indene resins. Of course, the separation can be conducted, if desired, to provide monomeric coumarone or indene which can then be polymerized to paracoumarone or paraindene (polyindene) resins, respectively.

The petroleum resins used in this invention are likewise well known in the art; see, for example, pages 296-299 of "The Chemistry of Commercial Plastics" by Wakeman, cited above. The cracking of petroleum gives an appreciable amount of readily polymerizable unsaturates that can be converted to hydrocarbon resins. Basically, such resins are soluble in both aliphatic and aromatic hydrocarbons and, hence, are ideally suited for use in the present invention.

Ethylenically unsaturated comonomers, such as ethylene, propylene and the like, are used as the copolymerizable component in the styrene and acrylic copolymers mentioned above. The expression "acrylic" copolymers herein is meant to be generic to copolymers of acrylic acid, alkyl acrylates, methacrylic acid and alkyl methacrylates. Such copolymers also function to provide the desired water-resistance properties in the resulting plaster composition.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications are intended to be included within the scope of the following claims.

It is claimed:

1. A plaster composition having water-resistance properties comprising 30 to 60% by weight of calcium